300.29

DRAFT
DNCT Biology
Meeting Notes
3/18/99
9:00-2:30

Attendees: Mike Fris, Karl Halupka, Pete Chadwick, Jim White, Dale Sweetnam, Bruce Herbold, Sheila Greene, Pete Rhoads, Dave Fullerton(phone), Earl Nelson, BJ Miller, Jim Buell, Tom Cannon, Ron Ott, Randy Bailey

Agenda:

i. Biological Guidelines for Gaming Modelers

Highlights

1. We developed a process and concept for establishing scores for entrainment and general habitat benefits for employing the EWA above the new baseline. Scores will be available for historic, new baseline, and for new EWA actions.

2. Scores for entrainment will be based on fish densities with some factor adjustments for actions like closure of DCC or employing Head-of-Old-River Barrier.

3. Scores for non-entrainment values will be based on qualitative risk factors for indirect effects of changing export rates or direct effects of using EWA to enhance X2 or other hydrological factors.

4. Scoring systems for fish species and life stage were not completed, but will be developed as we proceed into gaming. The process and framework for scoring were developed.

5. Schedule was identified for coming weeks.

A. Beginning Opinions on Process

- Intelligent guesses on fish response to hydrology and export changes will help gaming process and in deciding how to structure EWA.
- Appreciate need, but concerned that guesses will be too far off and cause serious errors.
- Others were worried about the consequences of errors.
- Because regulatory staff will have to convince their management that the game has value despite uncertainty of assumptions, we need to be more conservative.
- Need to characterize exactly what we are doing - assumptions, outcomes. Can we really predict hard numbers of entrainment impacts?
- Need to characterize to management the amount of uncertainty.
- Concerned about why we are doing this and what we are going to do with it when we have finished.
- Concerned as to why we are focusing only on export and X2?
- Potential grave consequences - high risk from being wrong.
- Concerned about fundamental assumptions and population level effects.
- Adaptive management interventions are needed.
- How big is the EWA account to be; what mix of assets are needed.

- Not concerned about a good scoring system; no need to get hung up on it; game will be valuable without the scoring system.

B. Bruce Herbold led discussion on biological rules:

- Assets are important, location is important because they define what we can do.
- Export reductions - how long do we reduce is important.

Delta Smelt Adults:

C: Delta smelt factor - the older they get and larger they grow the better able they are to cope and avoid export - then we should focus more on the habitat features of flow (e.g., X2) and less on export reductions. The risk to the population also goes down with time and the amount of adjustment needed for protection may be less.

C: Life stage is important in entrainment potential and effect on population.

C: The longer you apply a factor like export reduction the better. R: The longer you curtail is better is not valid if you have a small population in the area of the intakes that is salvaged quickly.

C: We should work both on magnitude and duration of factor.

C: We should factor in abundance and distribution on a daily basis, particularly in the area of the intakes.

- Suggestion: ▲Delta Smelt Adults Entrainment = ▲ exports x #days/30

C: Distribution is important because population may be far away and not vulnerable.

C: Decision on timing at the pumps - look at whole estuary population - what we are talking about is input for gaming - integrating information into our decisions during gaming.

C: Look at salvage data as advanced perception.

C: Operators need a weekly time frame - time frame also is important when we are addressing moving fish toward the pumps. R: 10-14 days may be more appropriate.

C: Having a forebay with more storage will help the timing issues. R: An expanded forebay may not be available in Stage 1.

C: We need to focus on the biological consequences of our actions and scoring them during gaming.

C: During gaming we should focus on fish per AF as a trigger for action and relaxation of an action. R: The model has #/AF built in.

- Emerging factor: entrainment / abundance / % in South Delta

C: Suggest net flow in Old River as a key parameter.

C: Suggest tidal phase as parameter - draining or filling (neap or spring) - damped by flow (ebb/flood).

C: Should consider risk to population not just entrainment.

C: Should also be looking at delta smelt survey data - track on maps as we look at salvage - Dale will bring historical data.

- Factors: f_1 (abundance), f_2 (salvage)

C: Suggest consider set of risk factors: starting with salvage, then water year type, then population stats (distribution and abundance), then hydrological conditions.

C: Adjust distribution based risk by particle travel times to pumps using particle tracking models.

- risk factor = (# entrained) x (% in south Delta) / Abundance

- rate factor $\times$ = ds/AF on day 1 $\div$ ds/AF on day 2

C: Suggest a scaling risk factor of 1 to 10. R: Consequences of applying an action is different then in determining whether to apply an action - we have both things in gaming.

C: We have to determine whether decision is important and the importance of an action.

C: We should focus on how much credit we give for reducing exports by some value (e.g., 50 AF).

- ▲dsadults tot ent = (▲hist exports) x (#day/✱);
  where ✱ is some function of #in Delta, change in ds/AF, or flow (SJ, Sac, or tide cycle)

C: also need to consider smelt distribution.

C: Need a simpler function.

C: How about a quantitative scale with #/AF multiplied by some factor that moves about 1. Greater than 1 if we want to show higher risk, and visa versa. R: A risk scalar factor.

C: We also need to assess whether some level of salvage is not significant to the population.

C: There needs to be some threshold below which we should do nothing.

C: We need to get back on defining a way to score our performance or we will be here til Christmas.

C: We need a scoring method that shows the effectiveness of using a certain amount of EWA water so we can compare the benefits among different applications of the EWA.

C: Rather than quantitative score, can we use a semi formal approach and abandon this equation thing - list conditions under which we would use the EWA water. R: we need quantitative score to show differences in applying EWA.

C: Can we list factors that adjust the scoring that is based on #/AF.

- ▲dsadults tot ent = (▲hist exports) x (risk factor based on issues)

C: Four problems facing gaming:

28. Do we adjust historical salvage and hydrology.
29. Once gaming starts, how do we make decisions to curtail exports
30. How do we decide what is saved and its importance.
31. If we did take an action, then how do we score it.

- three steps:
  - adjust historical salvage to baseline
  - apply trigger rule for using EWA
  - apply credit for action
  -

Adult Delta Smelt Credit for X2 change:

- 25% reduction in adult salvage if we move 1km downstream

C: no quantitative basis for this equation. R: Monthly X2 position is related to monthly salvage of delta smelt. R: Daily adult smelt events are not related to X2 position, more to magnitude of salvage - which in turn may be related to change in X2 position.

C: What is influence of X2 on density at pumps is of concern.

- 12% per mile reduction would be better

C: There should be no benefit of moving X2 downstream if HOR barrier is in.

- Reduce benefit by 50% if HOR barrier is in.

Delta Smelt Young

C: Also have a HOR barrier effect.

- reduce exports + flow change >> benefits to young smelt.

- reduce benefits by 50% if HOR barrier is in.

C: we should look at particle tracking model to see effect of HOR barrier. R: young smelt are surface oriented and would faster than model predicts, which could explain severe effect of HOR barrier on smelt salvage numbers for that one year when an effect was observed.

Sac Salmon Smolts

- DCC closure would reduce salvage loss by 50%.

- ▲ ent = ▲(XGEO/Sac Flow), where XGEO = flow through DCC and Gslough

C: We don' t know the proportion of Sac salmon in salvage. R: Analysis indicates that it is less than 10% for fry and smolt from Jan-Jun, except when exports are very high (>8,000 cfs?)

C: When DCC is open about 30% of Sac flow goes into interior Delta. Only about 10% when DCC is closed. That is why Sac salmon survival is higher with DCC closed. Georgianna fish do better when DCC is open. DCC closure has less benefit at high export rates.

C: Trend in 200+ release experiments is that there is no effect on population levels.

C: Entrainment is not only factor - hydrology changes from exports affect survival of salmon within the Delta.

C: At high flows smolts appear to get lost in the freshwater of the Delta because they can't find a salinity gradient to migrate to the Bay.

C: Neuman-Rice says there is a 25% improvement in salmon survival with closure of DCC.

Q: What is effect of exports on proportion of indirect effects? R: Export effects are small and uncertain for sac salmon.

C: Closing DCC then would have little effect on salvage of sac salmon. R: We should have

survival factor in addition to salvage factor to show benefits of actions in gaming because survival of sac salmon is related to export rates. Reverse flows affect Delta salmon. High exports affect sac salmon survival, even if not through entrainment. R: No analysis shows that exports have a significant effect on smolt survival.

C: Survival of sac smolts released in the Delta is higher if DCC is open.

C: Change in exports and high exports is related to deteriorating survival of salmon released into the interior Delta. It's a small but significant effect on sac salmon.

C: A 10-25% effect seems reasonable.

- for sac salmon apply flow split first to salvage per AF - 10% if DCC is closed; 30% if open
- at higher export rates (>8000 cfs) we would not give credit for closing DCC.
- add survival factor

lifestage	historical salvage	historical AF	Density #/AF	Modeled #/AF	Modeled Exports	Modeled salvage	Modeled broad value
DSAdul	50	500 AF	0.1	.08	250	20	X 2? Or simply another factor to consider

C: Hydrology and DCC determine proportion that gets into Delta - then export determines what proportion of those get salvaged.

C: Marty's recent study with late fall Coleman releases - BC similar to Ryde losses and to Georgianna release. Two Georgianna releases and high % loss compared to low loss rate of BC fish.

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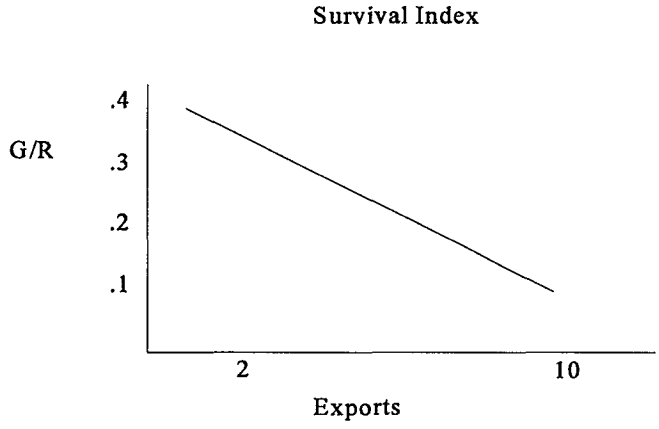

The survival index would vary something like this with the DCC open.

G/R = Georgianna to Ryde survival ratio.

C: Need to convince the services that a gallon of water will benefit the fish, and that our best guess will lead to protection of the fish. (Employment of the EWA over the new baseline - AFRP + Accord + new CALFED facilities - will adequately protect and enhance fish.)

C: Our objective is to have the modelers provide feed back to gaming group. Keep track of the water we put into the EWA and how we spend it, but also to score benefits of EWA use.

C: We should consider other benefits than just reduced entrainment.

B. Schedule

- George will have runs for two alternatives by Tuesday.
- Russ and Peter will have model updated to include five years (1988-1992) and ready to go by Tuesday.

Tuesday we will
- 9:00 - go through George's model outputs for two runs.
- 11:00-12:00 - Meet with Quinn-Spear group about our progress and direction.
- **1:00 - Begin gaming.**

Wednesday we will
- Conduct a small group test.

Thursday and Friday we will
- **Game**

Following Tuesday and Friday

- **Game**

April 2 - present results.